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Type 1536-A PHOTOELECTRIC PICKOFF

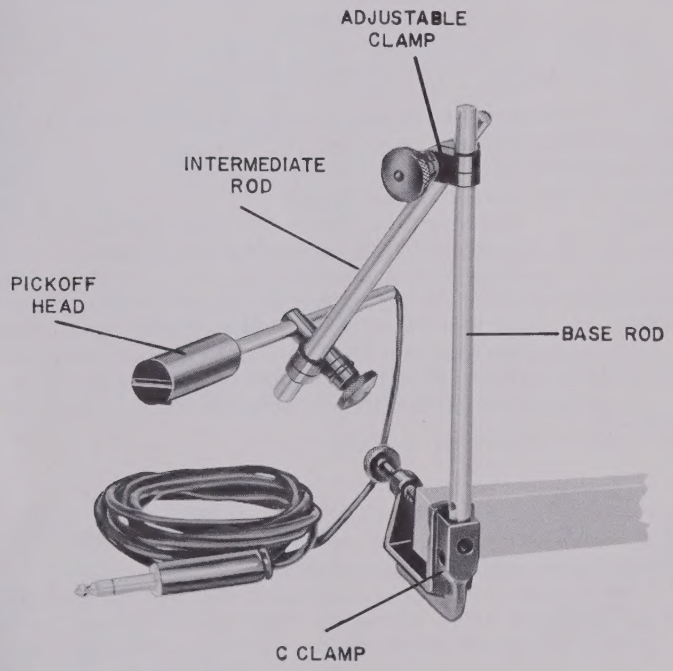

Figure 1. The Type 1536-A Photoelectric Pickoff.

1 DESCRIPTION.

1.1 GENERAL. The Type 1536-A Photoelectric Pickoff is used to obtain trigger pulses from a moving object for the synchronization of an electronic stroboscope with the object, or for the measurement of speed with a digital frequency meter. The pickoff consists of a light source, a simple cylindrical optical system, and a photocell. Variations in the amount of light reflected back to the photocell by the moving object produce electrical pulses. These pulses are applied to the input of the Type 1531-P2 Flash Delay to synchronize a Type 1539 Stroboslave, or stroboscope types 1531 and 1538. When the pulses are applied to the input of a Type 1150 or 1151 Digital Frequency Meter, the speed of the rotating object is shown on the readout.

An extremely flexible linkage system, consisting of three rods and two clamps, permits the head of the pickoff to be locked in practically any position.

1.2 EQUIPMENT SUPPLIED. The following table lists components (and replacement parts) of the GR 1536 Photoelectric Pickoff.

Name	*Description*	*Catalog Number*
GR 1536-A	Complete assembly	1536-9701
Accessory Pouch	Leather pouch for storage of components	1536-0451
Clamp	C clamp for mounting	1536-0430
Magnet Assembly	Magnetic base for mounting	1536-2000
Wrench	Rod for tightening base rod	1536-6030
Silver Tape	Reflective tape for dull surfaces	1536-0460
Black Tape	For use on highly reflective surfaces	1536-0470
Sleeve Attachment	Adjustable clamp, see Figure 1	1536-0440
Extension Shaft	Intermediate rod, see Figure 1	1536-6010
Clamp Arm	Base rod, see Figure 1	1536-6020
Pickoff-Head Assembly	Includes (see Figure 1) pickoff head, extension tube, adjustable clamp, and cable with phone plug	1536-3000
Lamp, P101*	Light source, Chicago Miniature Lamp Works #327, 28 V, 0.04 A	5600-0313
Photocell, PC101*	Type 1N2175; 50 V (max bias), 0.5 μA dark current at 25°C and 50 V.	6084-1004

*Replacement parts for Pickoff-head assembly.

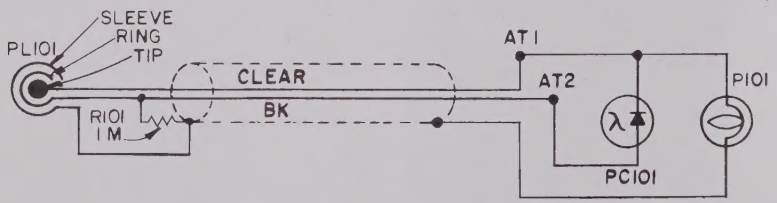

Figure 2. Circuit diagram of the Type 1536-A Photoelectric Pickoff.

2 OPERATING PROCEDURE.

2.1 INSTALLATION. Select the proper mounting device (either the C clamp or the small magnet) and screw the base rod into it. Insert the 1/8-inch-diameter rod in the hole in the mounting device and use it as a wrench to tighten the base rod. A choice of any of three tapped holes at right angles to each other in the C clamp provides flexibility in the placement of the pickoff head.

The pickoff head assembly mounts directly on the base rod by means of a clamp on the assembly. The intermediate rod should be used when greater distance is to be covered between the point of mounting and the pickoff head, or when more adjustment is needed to position the head properly. The separ-

ate clamp is used to attach the intermediate rod to the base rod. Release both clamps by loosening the knurled knob. Insert the 1/4-inch section of the intermediate rod in the small hole in the clamp (farthest from the knob). Pressure on the knob will open the hole. Then insert the base rod in the large hole in the clamp. Adjust the pickoff head to the desired position and turn the knurled knob clockwise to lock both rods in place. Loosen the knob slightly for minor adjustments. All clamps should be tightened securely to prevent movement of the pickoff due to vibrations.

Insert the phone plug, at the end of the cable, into the proper jack marked INPUT, on the front panel of the Type 1531-P2 Flash Delay, or marked PHOTOELECTRIC PICKOFF, at the back of the Type 1150 Digital Frequency Meter.

If the rotating object whose speed is to be measured is not highly reflective, attach a small piece of the reflecting tape to it. Use the black tape if the object is highly reflective. For surfaces with a medium reflectivity, attach a small piece of the reflecting tape and cover the rest of the periphery with the black tape.

The minimum distance between the pickoff head and the reflecting surface that will provide an adequate signal depends upon the reflectivity of the rotating surface, the ambient light, and the distance between reflecting strips, if more than one is used. In general, a distance of 1/2" to 1" from pickoff head to reflecting surface is satisfactory with one reflecting strip. Adjust the position of the pickoff head so that a steady reading is obtained on the frequency meter. The front face of the head should be parallel to the reflecting surface.

2.2 USE WITH TYPE 1531-P2 FLASH DELAY. The photoelectric pickoff plugs directly into the INPUT jack of the flash delay to provide synchronized pulses to drive the Types 1531, 1538, or 1539. The variable delay time produced by the flash delay enables the operator to view the moving object at any point in its cycle of rotation, even with small variations in the rotational speed. For further details, refer to the Operating Instructions for the Type 1531-P2 Flash Delay.

2.3 USE WITH DIGITAL FREQUENCY METERS. The Type 1150 Digital Frequency Meter, set for a 1-second gate period, measures the speed in revolutions per second with one reflecting strip on the rotating surface. For greater accuracy, set the gate period to 10 seconds and divide the reading of the frequency meter by 10 (to obtain the speed in revolutions per second). For revolutions per minute (RPM), place six reflecting strips on the rotating surface, use a 1-second gate period, and multiply the meter reading by 10. With six strips and a 10-second period, the frequency meter will read directly in RPM. To obtain a reading once every second, directly in RPM, sixty reflecting strips must be used on the rotating surface. As the number of strips is increased, it will be necessary to decrease the distance between the pickoff head and the reflecting surface to less than the nominal 1/2 inch suggested above.

2.4 WIDTH OF REFLECTING STRIPS. With slowly rotating objects, use narrow reflecting strips (approximately 1/16" wide) to eliminate multiple pulses caused by variations in the reflecting surface. For high speeds, increase the width of the strips (to 1/8" or 3/16") to give adequate pulse height.

3 SERVICE AND MAINTENANCE.

We warrant that each new instrument sold and manufactured by us is free from defects in material and workmanship, and that, properly used, it will perform in full accordance with applicable specifications for a period of two years after original shipment. Any instrument or component that is found within the two-year period not to meet these standards after examination by our factory, Sales Engineering Office, or authorized repair agency personnel, will be repaired, or, at our option, replaced without charge, except for tubes or batteries that have given normal service.

The Type 1536 Photoelectric Pickoff will require very little maintenance, except for the occasional replacement of the bulb. Remove the screw on the side of the pickoff head and use the cable to push the assembly out of the case. Loosen the screw on the back of the assembly; this will allow the spring held in place by this screw to be pushed aside. Then remove the bulb, insert the replacement (Chicago Miniature Lamp Works #327, 28 V, 0.04 Amp) with the filament oriented parallel to the slot in the pickoff head. Reverse the procedure to reassemble the pickoff. For best sensitivity, orient the lamp so that the plane of the filament is parallel to the axis of the lens.

If, for any reason, you feel that your unit does not operate properly, write to our Service Department, giving full information of the trouble and of steps taken to remedy it. Our Service Engineers will assist in any way possible.

SPECIFICATIONS

Maximum Pulse Rate: Approximately 2500 pulses per second as limited by the 200-microsecond time constant of the photocell and cable combination.

Power Requirements: 20 to 28 volts dc, 40 ma. Power is supplied by the Type 1531-P2 Flash Delay or the Type 1150-A (or Type 1151-A) Digital Frequency Meter.

Accessories Supplied: 10-ft roll of 3/8-inch black tape; 10-ft roll of 3/8-inch silver tape; carrying case.

Mounting: C-clamp (capacity 1-5/16 inches, flat or round) or 1½-inch magnet, both supplied.

Dimensions: Pickoff head, 11/16-inch diameter, 2 inches long. Linkage consists of two 5/16-inch-diameter stainless-steel rods, 6 and 6 1/4 inches long, and an adjustable connecting clamp. Cable is 8 feet long, terminated in phone plug.

Net Weight: 18 ounces (0.6 kg). **Shipping Weight:** 3 pounds (1.4 kg)

GENERAL RADIO COMPANY
WEST CONCORD, MASSACHUSETTS 01781

*NEW ENGLAND: 22 Baker Avenue
West Concord, Massachusetts 01781

*METROPOLITAN NEW YORK: 845 Broad Avenue
Ridgefield, New Jersey 07657

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CLEVELAND: 557[illegible]
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*DALLAS: 2600 Stemmons Freeway, Suite 210
Dallas, Texas 75207

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